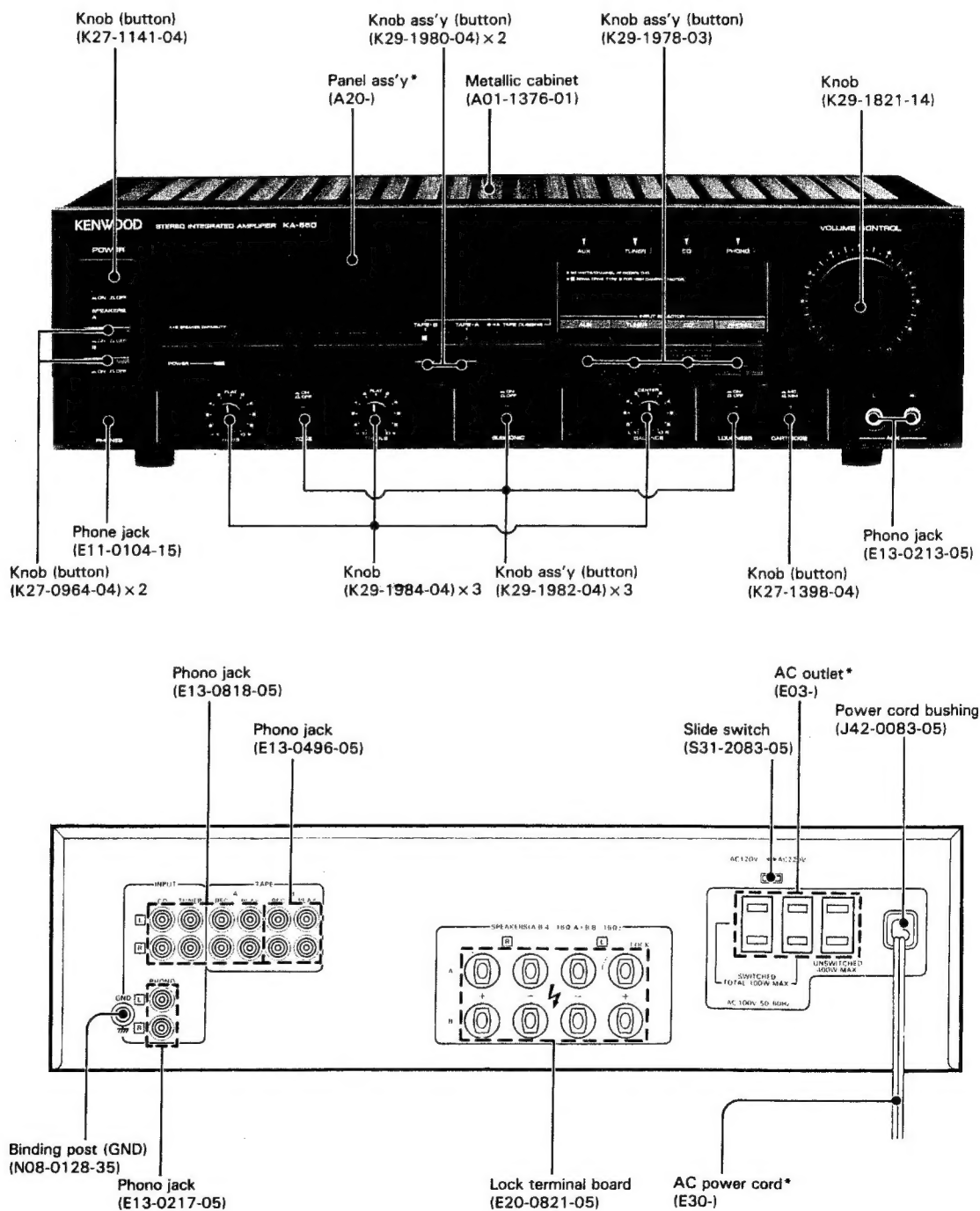


KENWOOD

KA-660

STEREO INTEGRATED AMPLIFIER



*Refer to Parts List on page 6.

DISASSEMBLY FOR REPAIR

REPLACEMENT OF PARTS ON AUDIO UNIT

1. Remove 2 screws at the chassis R (unified with the bottom plate) (1) and 3 screws at the rear panel (2).

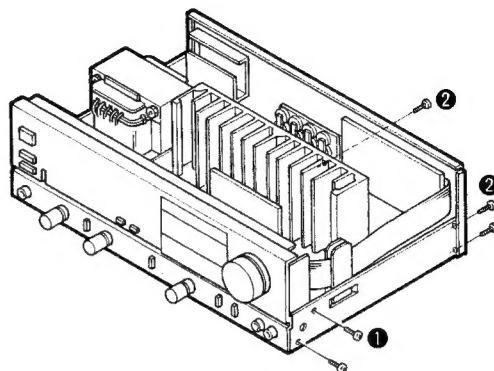


Fig. 1

2. Remove 6 screws at the bottom plate (3).
3. Slide and remove the bottom plate as shown by the arrow, being aware that parallel flat cable is sandwiched by pc boards (4).

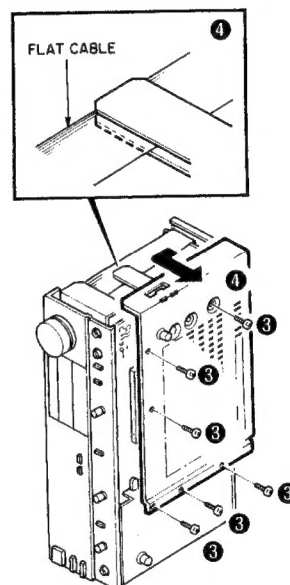


Fig. 2

REPLACEMENT OF PARTS ON MAIN AMP UNIT

4. Pull off BASS, TREBLE and BALANCE knobs (5). Remove 3 screws at the top of the panel ass'y (6).
5. Remove 4 screws at the sides of the chassis, 2 on each side, (7) and 3 screws at the bottom side of the panel ass'y (8).

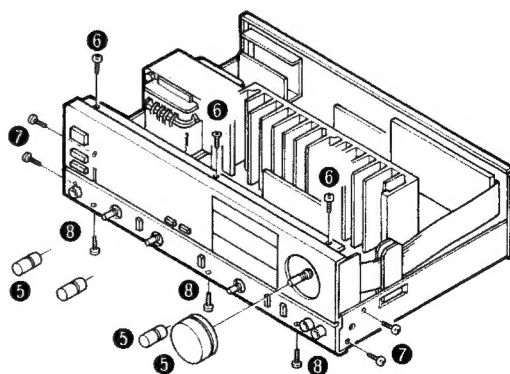
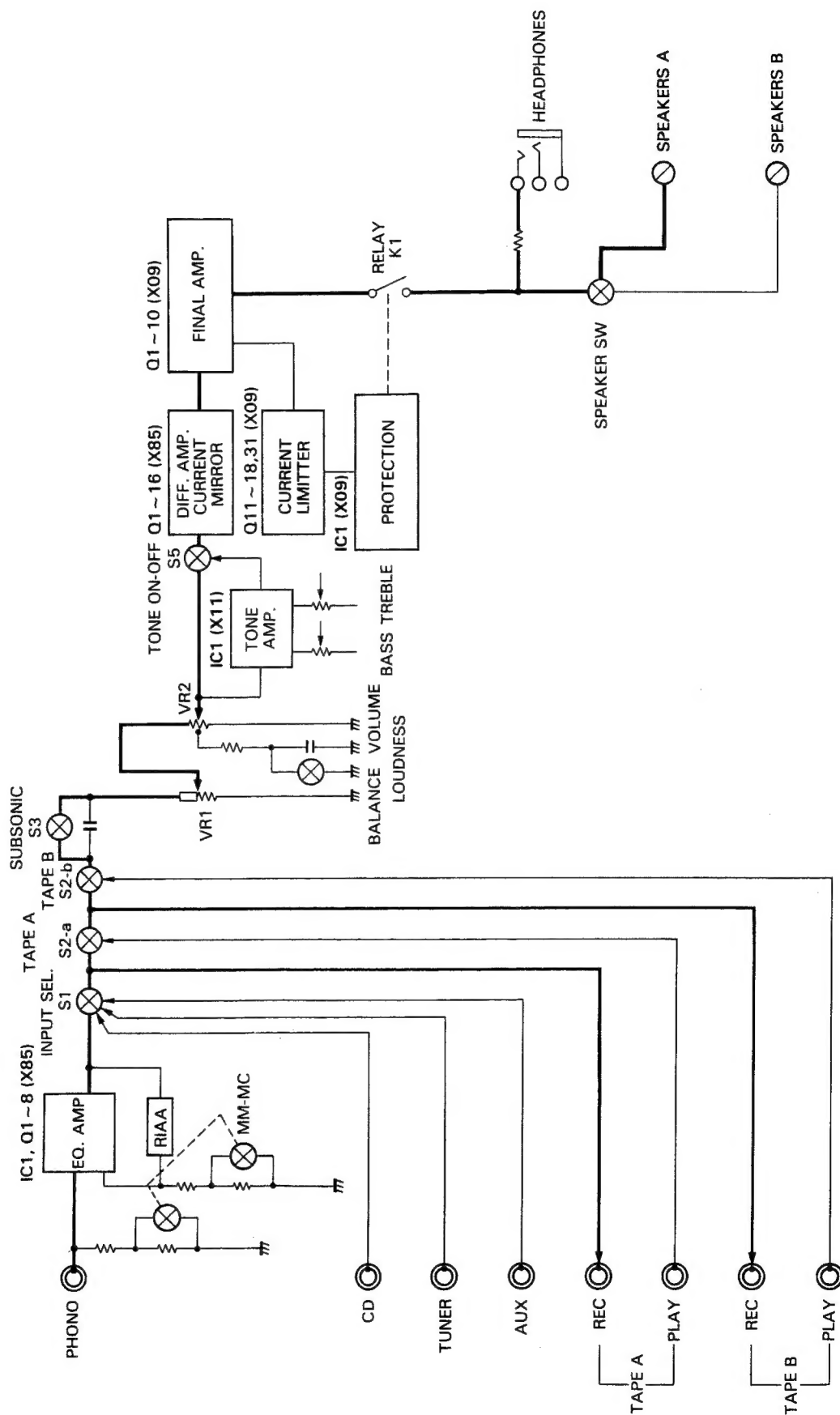


Fig. 3

BLOCK DIAGRAM



6. Disconnect parallel cords from their connectors and take the panel ass'y frontward (9 , 10).

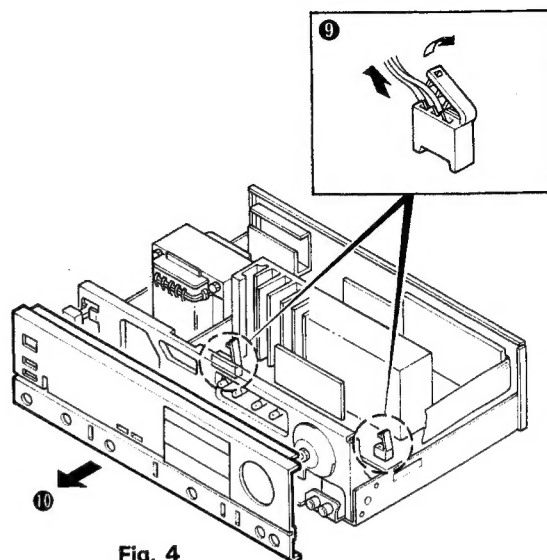


Fig. 4

REPLACEMENT OF FLAT CABLE

7. Pull both ends of the connector ends (11). Pull out the flat cable (12).
8. When plugging in the flat cable be sure the both ends are pulled up (13).
9. After the flat cable has been inserted, all the way, push the both ends of the connector (14). Make sure the flat cable is secured in the connector.

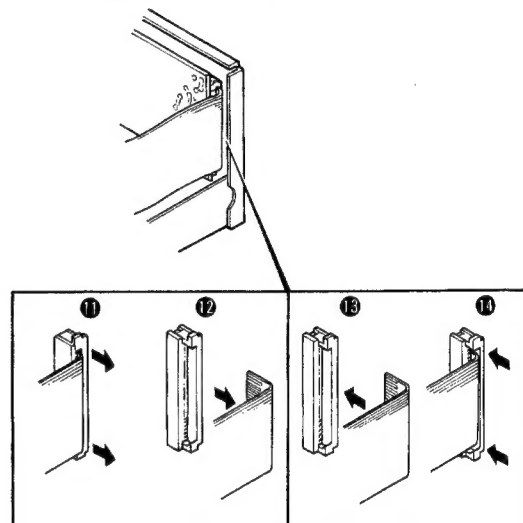


Fig. 5

REPLACEMENT OF PARTS ON CONTROL UNIT

10. Remove 2 screws retaining the escutcheon of the INPUT SELECTOR (15).
11. Pull the knobs off (16).
(Caution) Pull the knobs off at switch-off position. Pulling off at switch-on position will cause a lock malfunction. This switch is a short stroke type switch and for this reason, switch on-off position is not easily distinguished.
12. Remove 4 hexagonal nuts from the potentiometers (17).
13. Remove 2 screws retaining the selector switch (18).
14. Pull the sub chassis frontward (19).
15. Remove 2 push rivets retaining the pc board (20).

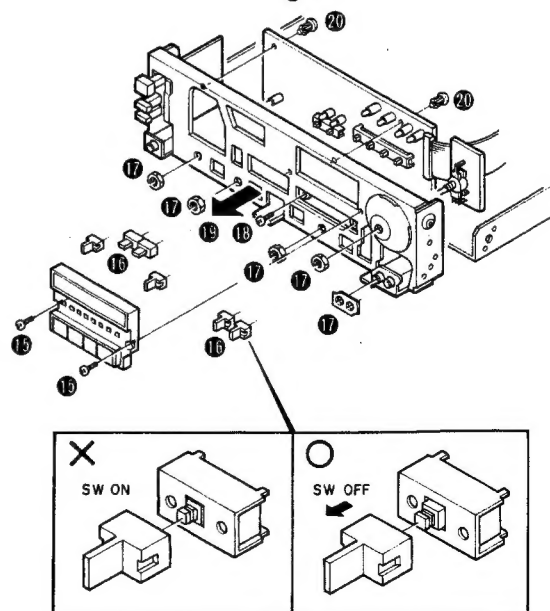


Fig. 6

CIRCUIT DESCRIPTION

PRE-AMP UNIT (X85-1010-10)

Components	Functions	Operations (Substitutions)
	Cascade amp.	
Q5-8	EQ circuit first-stage differential amp	
IC1	EQ circuit op-amp IC	

CONTROL UNIT (X11-2130-10)

Components	Functions	Operations (Substitutions)
IC1	Tone circuit op-amp	

AUDIO UNIT (X09-2130-10)

Components	Functions	Operations (Substitutions)
Q1, 2	Bias	
Q3-6	Driver	(2SA913, 2SC1913)
Q7-10	Final	
Q11-18, 31	Current limiter	Final protection circuit (Q17,18 for high voltage resistance) for over-load drive.
Q32, 33	Voltage regulator circuit	Voltage regulation circuit inserted into the B line towards the EQ circuit. (2SA1110, 2SC2590)
Q34, 35	PHONO shock noise prevention circuit Muting	When the B voltage of the EQ circuit drops by switching power ON, and when the drop of the -B voltage is slower than that of +B, chemical capacitors C27 and C28, which are inserted in the EQ and NF circuits, are charged and the time between the power ON and the stabilization of output in terms of DC increases. This circuit prevents shock noise or relay which could occur when MM/MC is switched later.
IC1	Protection IC	This circuit disconnects the relay when the amp is malfunctioning.
D11-14	Rectifier	(GP25, U05C (S))
D18, 19	AVR for increasing the voltage.	(RD22J (B), RD20J (B))
D22, 23	AVR for EQ.	(RD20J (B2))
D3, 4	Thermal compensation	

MAIN AMP UNIT (X85-1050-10)

Components	Functions	Operations (Substitutions)
Q1-4	Class A 1st stage differential amp	
Q5-8	2nd stage differential amp	
Q9, 10	Class A amp	
Q11-14	3rd stage differential amp	(2SC1904)
Q15, 16	Current mirror circuit	(2SA899)

ADJUSTMENT/REGLAGES/ABGLEICH

ADJUSTMENT

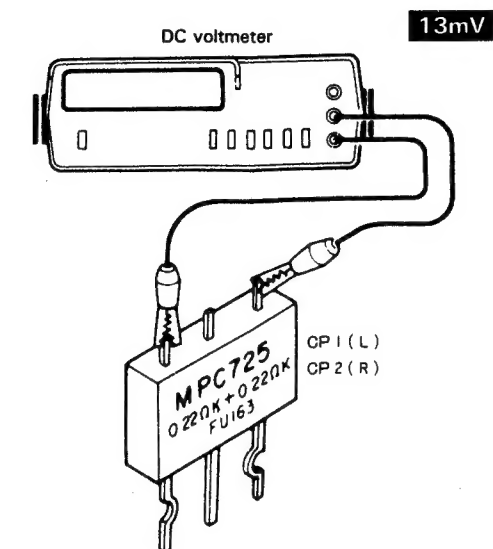
No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	AMPLIFIER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
1	IDLE CURRENT	—	Connect a DC voltmeter across CP1 (L) CP2 (R).	VOLUME: 0	VR1 (L) VR2 (R)	13mV	

REGLAGE

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DE L'AMPLIFICATEUR	POINTS L'ALIGNEMENT	ALIGNER POUR	FIG.
1	COURANT DE POLARISATION	—	Connecter un voltmètre CC sur CP1 (C) CP2 (D).	VOLUME: 0	VR1 (C) VR2 (D)	13mV	

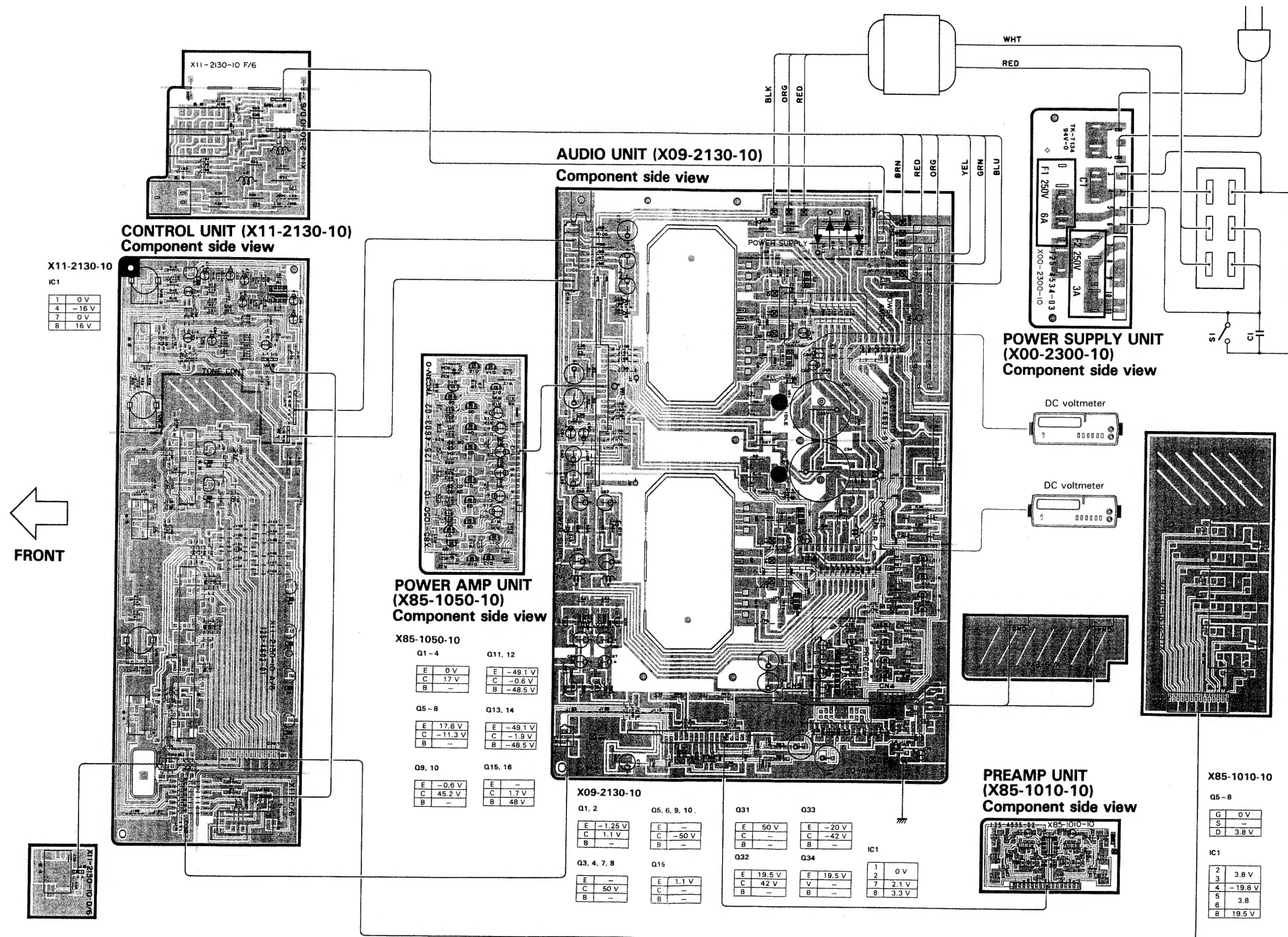
ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	VORSTÄRKER EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
1	LEERLAUFSTROM	—	Einen Gleichspannungsmesser über CP1 (L) CP2 (R) anschließen.	VOLUME: 0	VR1 (L) VR2 (R)	13mV	



KA-660 KA-660

PC BOARD



Refer to the schematic diagram for the values of resistors and capacitors.
The PC board drawing is viewing from the side easy to check.

KENWOOD

SPECIFICATION

EIA

Power Amplifier Section

Power Output

60 watts* per channel minimum RMS, both channels driven at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.006% total harmonic distortion

Both Channels Driven into

8 ohms at 1 kHz.....65 W + 65 W (Except USA, Europe, and U.K.)

4 ohms at 1 kHz.....90 W + 90 W (Except USA, Europe, and U.K.)

Dynamic Power Output.....145 watts at 4 ohms (Except USA, Europe, Australia, and U.K.)

Total Harmonic Distortion (AUX—SPKR 8 Ω)

at Rated Output,

20 Hz ~ 20,000 Hz.....0.006%

at 1/2 Rated Output,

20 Hz ~ 20,000 Hz.....0.004%

at Rated Output, 1,000 Hz.....0.003%

(PHONO—SPKR 8 Ω : at -20 dB VOLUME Level)

at Rated Output,

20 Hz ~ 20,000 Hz.....0.006%

Intermodulation Distortion

(60 Hz:7 kHz = 4:1).....0.006% at rated power into 8 ohms

Damping Factor.....1,000, at 50 Hz into 8 ohms

Transient Response

Rise Time.....3.5 μs

1 μs to 100 kHz

Input Sensitivity/Impedance

Phono MM.....2.5 mV/47 k ohms

Phono MC.....0.2 mV/100 ohms

TUNER, AUX., TAPE PLAY,

CD.....150 mV/47 k ohms

Signal-to-Noise Ratio (IHF-A)

Phono MM.....86 dB for 2.5 mV input

Phono MC.....68 dB for 250 μV input

TUNER, AUX., TAPE PLAY,

CD.....107 dB

Maximum Input Level for Phono

MM.....200 mV (RMS), T.H.D. 0.006% at 1 kHz

MC.....15 mV (RMS), T.H.D. 0.006% at 1 kHz

Output Level/Impedance

TAPE REC (P_{in}).....150 mV/220 ohms

Frequency Response for Phono.....RIAA standard curve ±0.3 dB (20 Hz to 20,000 Hz)

Tone Control

Bass.....±10 dB at 100 Hz

Treble.....±10 dB at 10 kHz

Loudness Control

(at -30 dB VOLUME Level).....+9 dB at 100 Hz

Subsonic Filter.....18 Hz, 6 dB/oct.

General

Power Consumption.....220 W

AC Outlets.....Switched 2, Unswitched 1 (Except U.K., European, Australian countries)

Dimensions.....W: 440 mm (17-5/16")
H: 133 mm (5-1/4")
D: 222 mm (8-11/16")

STEREO INTEGRATED AMPLIFIER

IEC

Power Amplifier Section

Rated Power Output

8 ohms at 20 Hz to 20,000 Hz no more than 0.006% THD (FTC)	60 W + 60 W
4 ohms at 60 Hz to 12.5 kHz no more than 0.7% THD (IEC/NF)	90 W + 90 W

Total Harmonic Distortion

Rated Power Output into 8 ohms	0.006%
Intermodulation Distortion	0.006%
Frequency Response	1 Hz - 100 kHz +0 dB, -3 dB

S/N Weighted: Rated Output Power (IEC-A)

() = Unweighted at 50 mW (DIN)

Phono MM	86 dB (55 dB)
Phono MC	68 dB (60 dB)
TUNER, AUX., TAPE PLAY, CD	107 dB (57 dB)

Damping Factor at 8 ohms, 50 Hz 1,000

Transient Response

Rise Time	3.5 μ s
-----------	-------------

Input Sensitivity/Impedance

Phono MM	2.5 mV/47 k Ω
Phono MC	0.2 mV/100 Ω
TUNER, AUX., TAPE PLAY, CD	150 mV/47 k Ω

Tone Control

Bass 100 Hz	± 10 dB
Treble 10 kHz	± 10 dB

Loudness Control (-30 dB) 9 dB at 100 Hz

General

Power Consumption

IEC 220 W

Dimensions

W: 440 mm

H: 133 mm

D: 333 mm

Weight (Net)

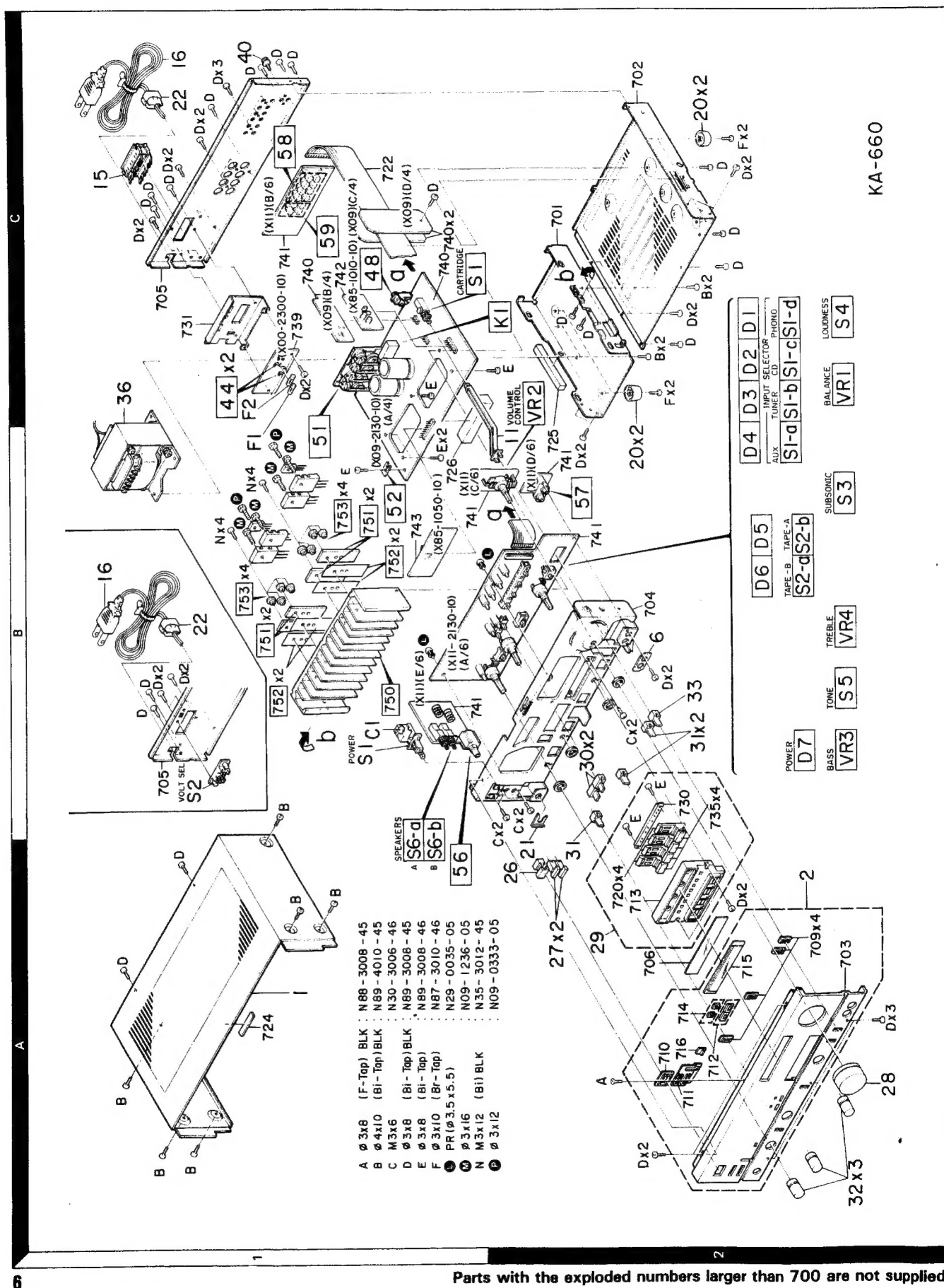
8.9 kg

Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.

Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen

EXPLODED VIEW



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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
KA-660						
1	1A		A01-1376-01	METALLIC CABINET		
2	2A	*	A20-4366-02	PANEL ASSY	KPUM	
2	2A	*	A20-4366-02	PANEL ASSY	UEXE	
2	2A	*	A20-4367-02	PANEL ASSY	T	
6	2B		B03-0229-14	DRESSING PLATE (FRONT AUX)		
-			B46-0092-03	WARRANTY CARD	K	
-			B46-0094-03	WARRANTY CARD	UE	
-			B46-0095-03	WARRANTY CARD	UE	
-			B46-0096-13	WARRANTY CARD	X	
-			B46-0121-03	WARRANTY CARD	P	
-			B46-0122-13	WARRANTY CARD	E	
-			B46-0123-03	WARRANTY CARD	T	
-		*	B50-5502-00	INSTRUCTION MANUAL (ENGLISH)	KPUM	
-		*	B50-5502-00	INSTRUCTION MANUAL (ENGLISH)	UEXE	
-		*	B50-5503-00	INSTRUCTION MANUAL (FRENCH)	PMXE	
-		*	B50-5504-00	INSTRUCTION MANUAL (SPANISH)	M	
-		*	B50-5506-00	INSTRUCTION MANUAL (ENGLISH)	T	
-		*	B50-5507-00	INSTRUCTION MANUAL (D.T.G)	E	
-			B58-0222-14	CAUTION CARD (PRE-SET 220V)	UE	
-			B58-0223-04	CAUTION CARD (PRE-SET 120V)	U	
-			B58-0245-33	CAUTION CARD (FTZ)	E	
-			B58-0269-04	CAUTION CARD	K	
-			B59-0092-00	SERVICE DIRECTORY	UE	
△ C1	1B		C91-0023-05	CERAMIC 0.01UF AC250V	UMUE	
△ C1	1B		C91-0647-05	CERAMIC 0.01UF P	KPXT	
11	2B		D21-1068-03	EXTENSION SHAFT		
△ 15	1C		E03-0068-05	AC OUTLET	P	
△ 15	1C		E03-0069-05	AC OUTLET	KUMUE	
△ 16	1B, 1C		E30-0181-05	AC POWER CORD	K	
△ 16	1B, 1C		E30-0459-05	AC POWER CORD	E	
△ 16	1B, 1C		E30-0587-15	AC POWER CORD	T	
△ 16	1B, 1C		E30-0812-05	AC POWER CORD	UMUE	
△ 16	1B, 1C		E30-0974-05	AC POWER CORD	P	
△ 16	1B, 1C		E30-1341-05	AC POWER CORD	X	
△ F1	1B		F05-4022-05	FUSE (250V 4A)	UMUE	
△ F1	1B		F05-4025-05	FUSE (SEMKO) (250V T4A)	E	
△ F1	1B		F06-4024-05	FUSE (UL) (250V 4A)	KP	
△ F2	1C		F05-2023-05	FUSE (250V 2A)	UMUE	
△ F2	1C		F06-2021-05	FUSE (SEMKO) (250V T2A)	XTE	
-		*	H01-5321-04	ITEM CARTON CASE	KPUM	
-		*	H01-5321-04	ITEM CARTON CASE	UEXE	
-		*	H01-5322-04	ITEM CARTON CASE	T	
-		*	H10-1770-02	POLYSTYRENE FOAMED FIXTURE		
-		*	H10-1771-02	POLYSTYRENE FOAMED FIXTURE		
-			H25-0224-04	PROTECTION BAG (800X400)		
-			H25-0232-04	PROTECTION BAG (235X350)		
20	2B, 2C		J02-0127-05	FOOT		
21	2A		J21-3326-05	JACK MOUNTING HARDWARE		
△ 22	1B, 1C		J42-0083-05	POWER CORD BUSHING		
-			J61-0307-05	WIRE BAND		

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
26	2A		K27-1141-04	KNOB (BUTTON) POWER		
27	2A		K27-0964-04	KNOB (BUTTON) SPEAKERS		
28	2A		K29-1821-14	KNOB VOLUME		
29	2A		K29-1978-03	KNOB ASSY(BTN) INPUT SELECTOR		
30	2B		K29-1980-04	KNOB ASSY(BTN) TAPE		
31	2A, 2B		K29-1982-04	KNOB ASSY(BTN) TONE, SUB-LOUD		
32	2A		K29-1984-04	KNOB BASS, TREBLE, BALANCE		
33	2B		K27-1398-04	KNOB (BUTTON) CARTRIDGE		
△ 36	1C	*	L01-6651-05	POWER TRANSFORMER	KP	
△ 36	1C	*	L01-6652-05	POWER TRANSFORMER	XT	
△ 36	1C	*	L01-6656-05	POWER TRANSFORMER	UMUEE	
40	1C		N08-0120-35	BINDING PNST (6ND)		
L	1B, 2B		N29-0035-05	PUSH RIVET (φ3.5X5.5)		
△ S1	1B		S40-1073-05	PUSH SWITCH (POWER)		
△ S2	1B		S31-2083-05	SLIDE SWITCH (VOLTAGE SELECT)	UMUEE	
POWER SUPPLY UNIT (X00-2300-10)						
△ C1	1B		C91-0023-05	CERAMIC 0.01UF AC250V	UMUE	
△ C1	1B		C91-0647-05	CERAMIC 0.01UF P	KPXT	
44	1C		J13-0041-05	FUSE CLIP	KPUM	
44	1C		J13-0041-05	FUSE CLIP	UE	
44	1C		J13-0054-05	FUSE CLIP	XET	
AUDIO UNIT (X09-2130-10)						
C1 ,2			CE04FW0J102M	ELECTR0 1000UF 6.3WV		
C3 ,4			CC45FSL1H180J	CERAMIC 18PF J		
C5 -8			CC45FSL1H331J	CERAMIC 330PF J		
C9 ,10			CE04FW1A220M	ELECTR0 22UF 10WV		
C11 -14			CF92FV1H393J	MF 0.039UF J		
C15 ,16			CF92FV1H334J	MF 0.33UF J		
C19 -22			CK45FF1H472Z	CERAMIC 4700PF Z		
C23 ,24			CC45FSL1H221J	CERAMIC 220PF J	XTE	
C25 ,26			CC45FSL1H101J	CERAMIC 100PF J	KPUM	
C25 ,26			CC45FSL1H101J	CERAMIC 100PF J	UE	
C25 ,26			CC45FSL1H121J	CERAMIC 120PF J	XTE	
C27 ,28			CE04FW0J222M	ELECTR0 2200UF 6.3WV		
C31 -34			CK45FB1H102K	CERAMIC 1000PF K	XTE	
C31 ,32			CK45FB1H102K	CERAMIC 1000PF K	KPUM	
C31 ,32			CK45FB1H102K	CERAMIC 1000PF K	UE	
C35 ,36			CC45FSL1H020C	CERAMIC 2.0PF C		
C37 ,38			CF92FV1H104J	MF 0.10UF J		
C51 ,52			CK45FE2H103P	CERAMIC 0.010UF P		
C53 ,54			C90-0492-05	ELECTR0 10000UF 56WV		
C55 ,56		*	CE04FW1J330M	ELECTR0 33UF 63WV		
C57 ,58			CE04FW1H470M	ELECTR0 47UF 50WV		
C59 ,60			CE04FW1E101M	ELECTR0 100UF 25WV		
C61 ,62			CE04FW1J101M	ELECTR0 100UF 63WV		
C63 ,64			CF92FV1H103J	MF 0.010UF J		
C65 ,66			CE04FW1E101M	ELECTR0 100UF 25WV		
C67 ,68			CE04FW1E470M	ELECTR0 47UF 25WV		
C69 ,70			CF92FV1H103J	MF 0.010UF J		
C71			CE04FW1E101M	ELECTR0 100UF 25WV		
C72			CE04FW1J101M	ELECTR0 100UF 63WV		
C73			CE04FW1C470M	ELECTR0 47UF 16WV		

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C74 C75 C76 C77 ,78 C79			CE04FW1V4R7M CE04HW1E100M CE04FW1A220M CE04FW1E101M CE04FW1H0R1M	ELECTR0 4.7UF 35WV NP-ELEC 10UF 25WV ELECTR0 22UF 10WV ELECTR0 100UF 25WV ELECTR0 0.1UF 50WV		
C80 ,81 C82 C83 ,84		*	CE04FW2AR22M CF92FV1H223J CE04FW2A010M	ELECTR0 0.22UF 100WV MF 0.022UF J ELECTR0 1.0UF 100WV		
48 51 52	1C 1B 1B		E13-0217-05 E20-0821-05 E23-0125-05	PHONE JACK (2P) PHONE LOCK TERMINAL BOARD(8P) SP TERMINAL (GND)		
L1 ,2 L3 -6			L40-1011-47 L40-1011-14	SMALL FIXED INDUCTOR(100UH,K) SMALL FIXED INDUCTOR(100UH,K)	XTE	
M P	1B 1B		ND9-1236-05 ND9-0333-05	TAPPING SCREW (Ø3X16) TAPPING SCREW (Ø3X12)		
CP1 ,2 R7 -10 R15 -18 R19 -22 R27 -30			R90-0187-05 RD14AB2E101J RD14AB2E101J RD14AB2E4R7J RD14AB2E102J	MULTI-COMP 0.22X2 K 5W FL-PROOF RD 100 J 1/4W FL-PROOF RD 100 J 1/4W FL-PROOF RD 4.7 J 1/4W FL-PROOF RD 1.0K J 1/4W		
R39 ,40 R71 R80 R81 ,82 R83 ,84		*	RS14DB3D4R7J RS14DB3D152J RD14AB2E100J RD14AB2E4R7J RS14DB3A561J	FL-PROOF RS 4.7 J 2W FL-PROOF RS 1.5K J 2W FL-PROOF RD 10 J 1/4W FL-PROOF RD 4.7 J 1/4W FL-PROOF RS 560 J 1W		
R85 ,86 R87 ,88 R89 ,90 R95 R98		*	RS14DB3A102J RS14DB3D182J RS14DB3D331J RD14AB2E4R7J RD14AB2E101J	FL-PROOF RS 1.0K J 1W FL-PROOF RS 1.8K J 2W FL-PROOF RS 330 J 2W FL-PROOF RD 4.7 J 1/4W FL-PROOF RD 100 J 1/4W		
R99 R100 VR1 ,2		*	RS14DB3D102J RS14DB3A103J R12-0094-05	FL-PROOF RS 1.0K J 2W FL-PROOF RS 10K J 1W TRIMMING POT. (470) IDLE ADJ		
K1 S1	2C 1C		SS1-2060-05 S40-6027-05	MAGNETIC RELAY PUSH SWITCH (MC/MM)		
D1 ,2 D1 ,2 D3 ,4 D11 -14 D15			1SS131 1SS178 MA27W(A) S3V20 DSM1A1	DIODE DIODE VARISTOR DIODE DIODE		
D16 ,17 D16 ,17 D18 D19 D20 ,21			1SS131 1SS178 RD22JS(B) RD20JS(B2) E-272	DIODE DIODE ZENER DIODE ZENER DIODE CONSTANT CURRENT DIODE		
D22 ,23 D24 ,25 IC1 Q1 ,2 Q3 ,4		*	RD20JS(B2) RD16E(B) UPC1237H 2SC3419(Y) 2SC2591(Q,R,S)	ZENER DIODE ZENER DIODE IC(PROTECTION) TRANSISTOR TRANSISTOR		
Q5 ,6 Q7 ,8		*	2SA1111(Q,R,S) 2SC3280*5	TRANSISTOR TRANSISTOR		

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Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C5 ,6 C7 ,8			CF92FV1H393J CE04HW1E100MEL	MF 0.039UF J NP-ELEC 10UF 25WV		
R7 ,8 R9 ,10		*	RN14BK2C6811FTS RN14BK2C8252FTS	RN 6.81K F 1/6W RN 82.5K F 1/6W		
IC1 Q5 -8 Q5 -8			NJM4560D-N 2SK170(BL) 2SK170(V)	IC(OP AMP X2) FET FET		
POWER AMP UNIT (X85-1050-10)						
C1 ,2 C3 -6 C7 ,8 C9 ,10 C11 -14			CE04FW1H2R2MEL CC45FSL1H101J CC45FSL1H331J CC45FSL1H150J CE04FW1H010MEL	ELECTR0 2.2UF 50WV CERAMIC 100PF J CERAMIC 330PF J CERAMIC 15PF J ELECTR0 1.0UF 50WV		
C15 ,16 C17 ,18			CK45FB1H152K CK45B1H561K	CERAMIC 1500PF K CERAMIC 560PF K		
R11 ,12 R31 -34			RD14AB2E101JTS RD14AB2E221JTS	FL-PROOF RD 100 J 1/4W FL-PROOF RD 220 J 1/4W		
D1 -6 D1 -6 Q1 -4 Q5 -8 Q5 -8			1SS133 1SS176 2SC1845(F,E) 2SA733(A)(Q,P) 2SA999(E,F)	DIODE DIODE TRANSISTOR TRANSISTOR TRANSISTOR		
Q9 -14 Q15 ,16			2SC2632(Q,R,S) 2SA1124(Q,R,S)	TRANSISTOR TRANSISTOR		

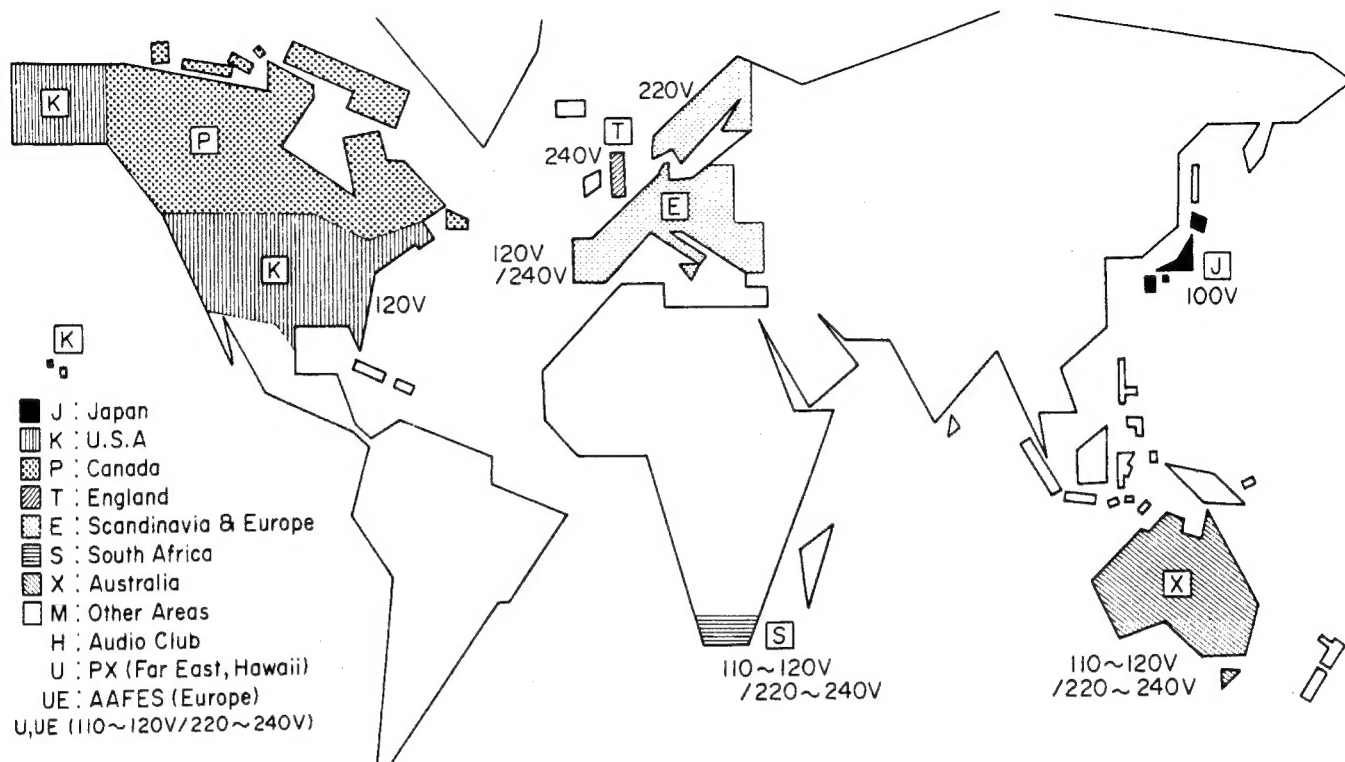
E: Scandinavia & Europe H: Audio Club K: USA P: Canada

S: South Africa T: England U: PX(Far East, Hawaii)

UE: AAFES(Europe) X: Australia M: Other Areas

⚠ indicates safety critical components.

WORLD MAP & AREA CODE



Note:

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

TRIO-KENWOOD CORPORATION

Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

KENWOOD ELECTRONICS
DIVISION OF KENWOOD U.S.A. CORPORATION
1315 E. Watsoncenter Rd., Carson, California 90745, U.S.A.
75 Seaview Drive, Secaucus, New Jersey 07094, U.S.A.

TRIO-KENWOOD CANADA INC.
1070 Jayson Court, Mississauga, Ontario, Canada L4W 2V5

TRIO-KENWOOD ELECTRONICS, N.V.
Leuvensesteenweg 504 B-1930 Zaventem, Belgium

TRIO-KENWOOD ELECTRONICS GmbH
Rembrücker Str. 15, 6056 Heusenstamm, West Germany

TRIO-KENWOOD FRANCE S.A.
5, Boulevard Ney, 75018 Paris, France

TRIO-KENWOOD (AUSTRALIA) PTY. LTD. (INCORPORATED IN N.S.W.)
4E Woodcock Place, Lane Cove, N.S.W. 2066, Australia

KENWOOD & LEE ELECTRONICS, LTD.
Wang Kee Building, 5th Floor, 34-37, Connaught Road, Central, Hong Kong

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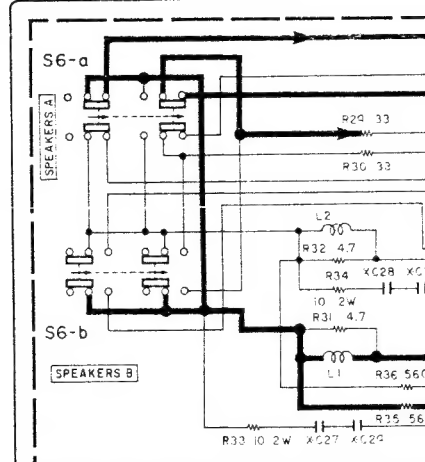
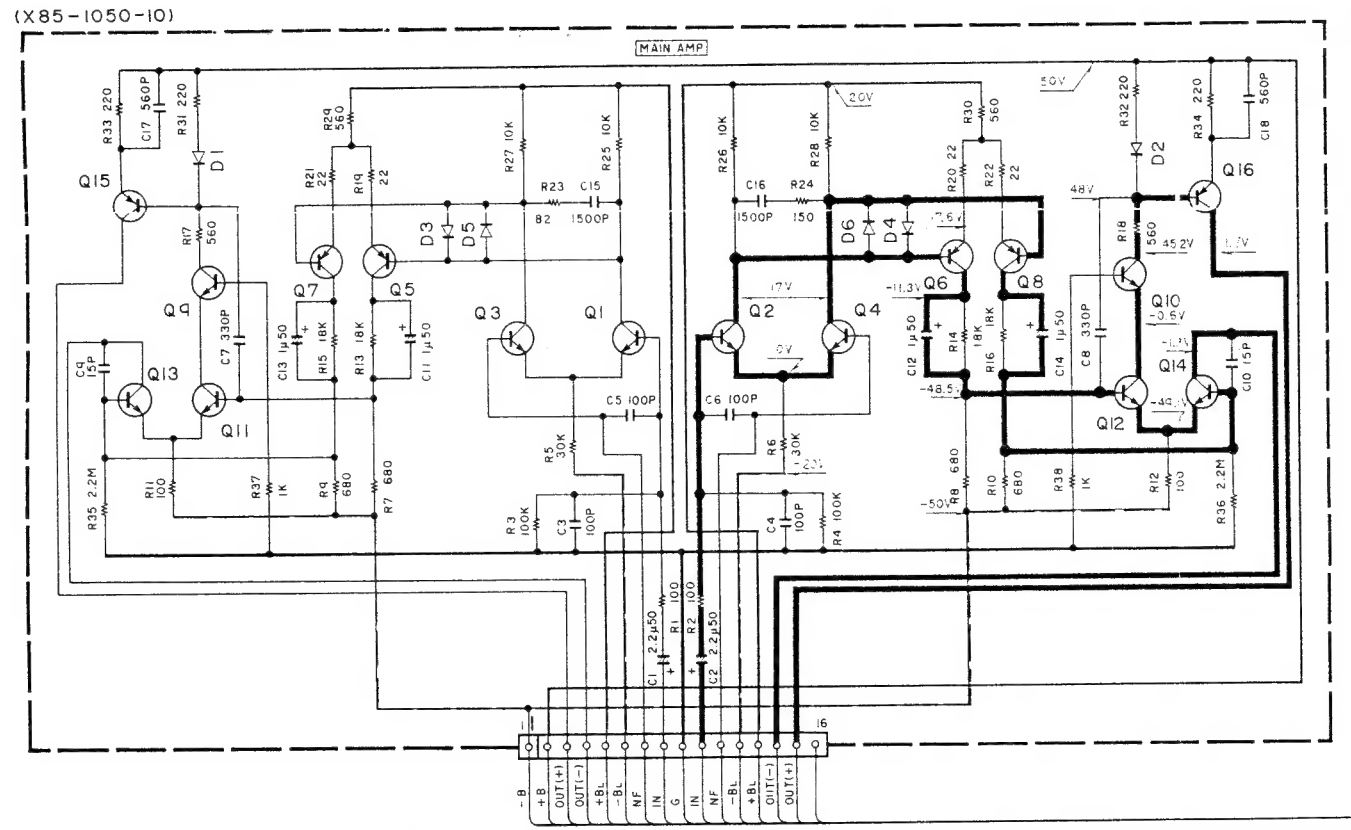
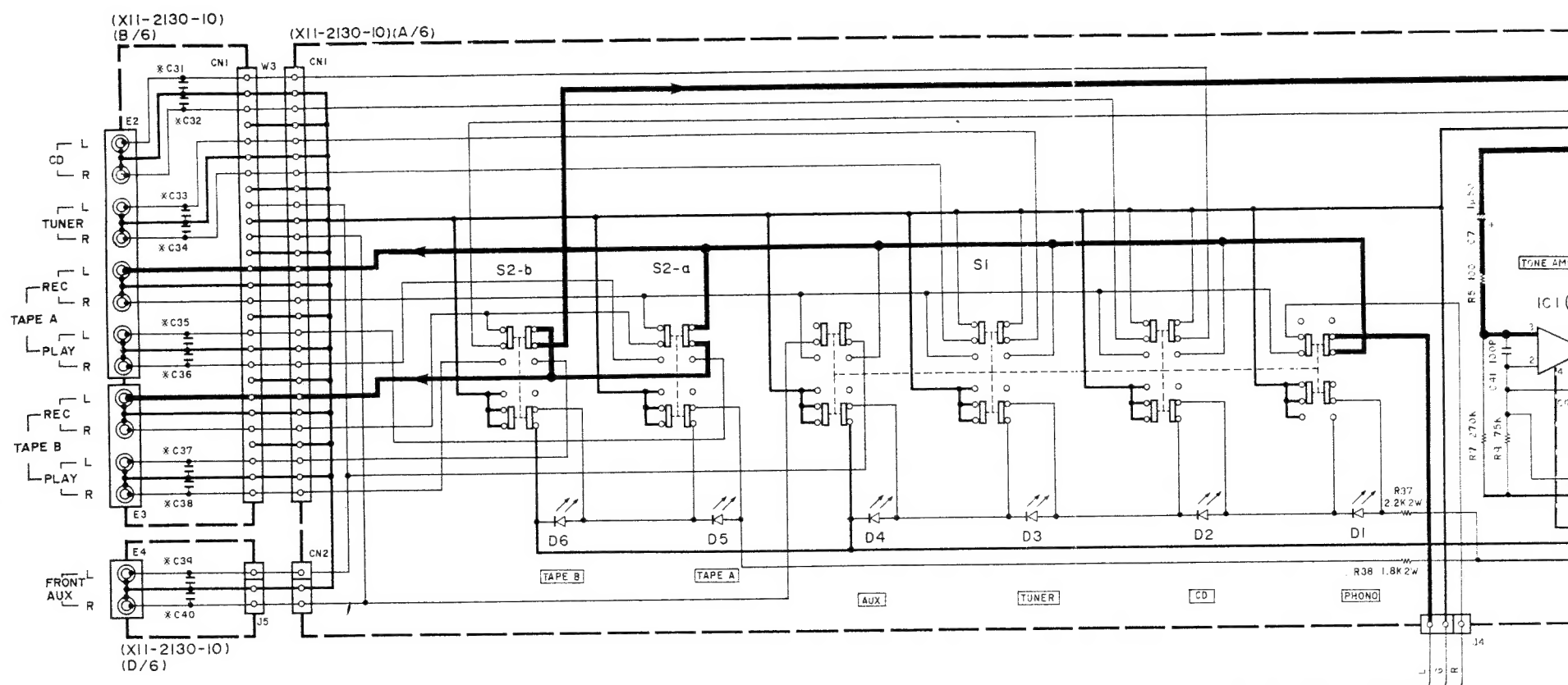
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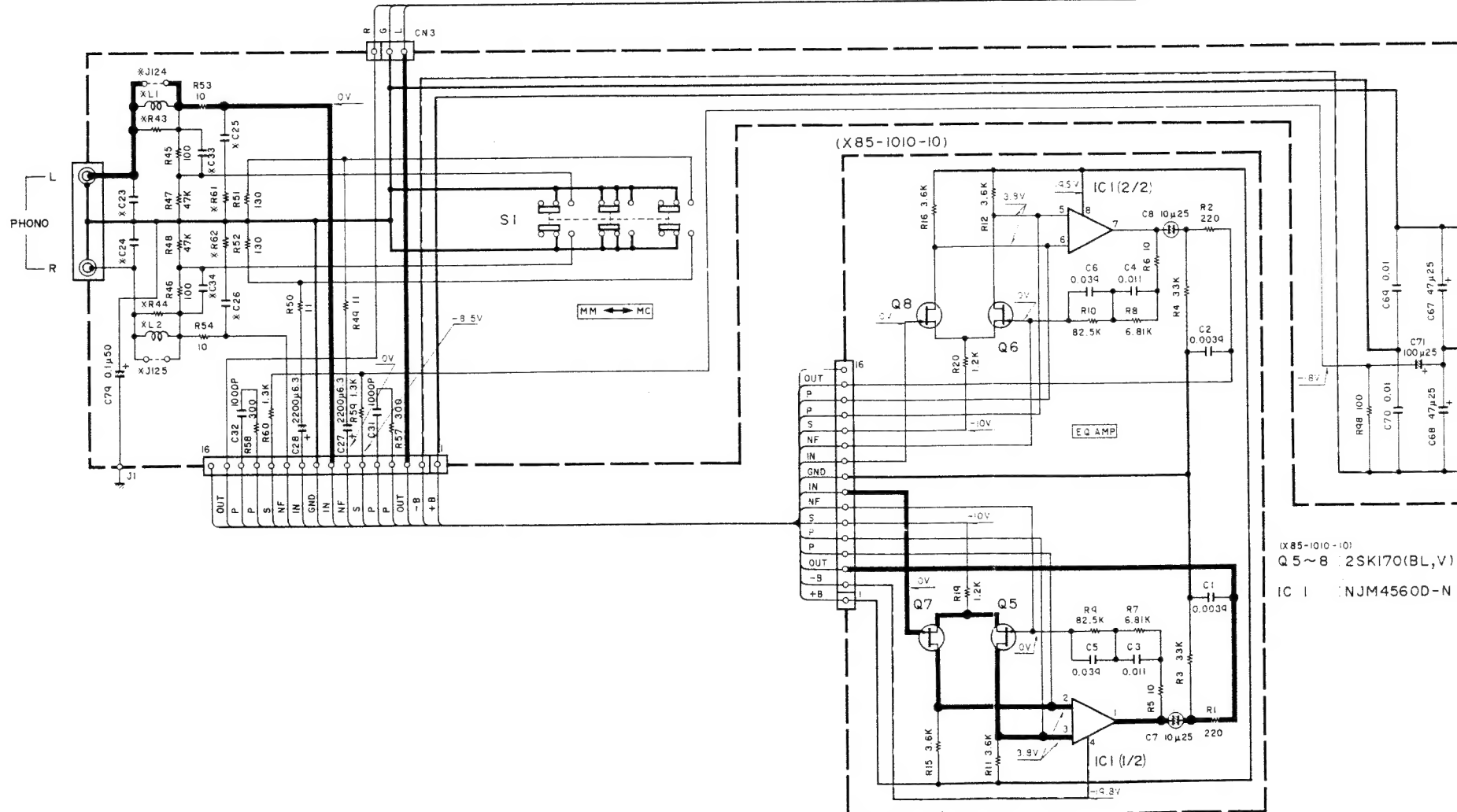
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Q1 ~ 4 : 2SC1845(F,E)
 Q5 ~ 8 : 2SA733(A)(Q,P) or
 2SA999(E,F)
 Q9 ~ 14 : 2SC2632(Q,R,S)
 Q15,16 : 2SA1124(Q,R,S)
 D1 ~ 6 : 1SS176 or
 1SS133



(X85-1010-10)
 Q5 ~ 8 : 2SK170(BL,V)
 IC1 : NJM4560D-N

2SA1124 2SC2320
 2SA733 (A) 2SC2631
 2SA992 2SC2632
 2SA999 2SC945 (A)
 2SC1845

2SB772

2SD882

2SA1111

2SC2591

2SC3419

2SA1301*5

2SC3280*5

2SK170

NJM4558D (A)
 NJM4560D-N

μPC1237H

